FOUR

Counterterrorism

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Counterterrorism consists of government actions to inhibit terrorist attacks or curtail their consequences. Such policies can limit attacks by confronting terrorists directly. For example, intelligence and police investigations resulted in the capture of the entire leadership of Direct Action (DA) in France between 1982 and 1987 (Alexander and Pluchinsky, 1992, p. 135; Hoffman, 1998). Italian authorities captured most of the Red Brigades after responding to a tip-off in the kidnapping of Brigadier General James Lee Dozier, the senior US officer at NATO's southern European command who was abducted from his home on 17 December 1981. He was freed unharmed in a daring police rescue on 28 January 1982.[1] Based on state's evidence obtained from Antonio Savasta, captured during the raid, the police later apprehended 200 Red Brigade suspects, which resulted in further arrests and the eventual demise of the group. Other counterterrorism actions can safeguard potential terrorist targets by reducing an attack's likelihood of success or its expected payoff. The installation of metal detectors in US airports on 5 January 1973 decreased terrorists' probability of success, as did the fortification of US embassies in the mid-1970s and beyond. After 9/11, the deployment of federal screeners at US airports, the reinforcement of airplane cockpit doors, and the designation of no-fly zones in Washington, DC, and other American cities were intended to limit terrorists' success and, thereby, to prevent attacks.

[1] For a detailed account of the Dozier kidnapping and its aftermath, see Mickolus, Sandler, and Murdock (1989, vol. 1, pp. 234–9), which is compiled from newspaper accounts at the time of the kidnapping.

The purpose of this chapter is to investigate and evaluate the two primary categories of counterterrorism policies – proactive and defensive. Proactive or offensive measures attack the terrorists, their resource base, or those who support them. By contrast, defensive or passive policies erect a protective barrier around potential targets – physical or human. Such measures dissuade terrorists by decreasing their anticipated gains from attacks. This can occur if their costs are raised or their anticipated benefits are reduced. Defensive actions may also limit attacks if alternative nonterrorist actions are made more attractive.

This chapter casts light on two puzzles. First, we explain why there appears to be a proclivity for most countries to rely on defensive rather than proactive policies when addressing transnational terrorism, and why this tendency does not appear to characterize actions with respect to domestic terrorism. Nations are quite proactive in pursuing domestic groups when they harm interests at home – either directly or indirectly, through collateral damage. European action to dismantle many of the fighting communist organizations, such as the Combatant Communist Cells and the Red Brigades, in the 1980s is testimony to this proactive stance with respect to domestic terrorism. Israeli aggression against the Hezbollah and Hamas leadership in recent years also exemplifies this orientation. Second, for transnational terrorism, we explain the tendency for the world community to rely on one or two nations' proactive responses. To accomplish these goals, we employ some elementary game theory to identify strategic differences among participants. We are particularly interested in the strategic interaction among targeted governments, which may actually work at cross purposes as they independently make policy choices.[2]

Both this chapter and the next focus on counterterrorism. A conclusion common to both chapters is that an inappropriate level of antiterrorist actions often results especially when addressing *transnational* terrorism, because countries do not account for the costs and benefits that their independent choices imply for other countries. There is a marked tendency to engage in too much defensive action and not enough proactive

[2] The relevant literature on strategic interaction among targets includes Arce and Sandler (2005), Heal and Kunreuther (2003, 2005), Kunreuther and Heal (2003), Lee (1988), Lee and Sandler (1989), Sandler and Arce (2003), Sandler and Enders (2004), Sandler and Lapan (1988), and Sandler and Siqueira (2005). Interaction between target and terrorists, when policies are decided, is addressed by Enders and Sandler (1993, 1995), Jain and Mukand (2004), Lapan and Sandler (1993), Rosendorff and Sandler (2004), and Sandler, Tschirhart, and Cauley (1983).

measures. This follows because defensive measures often transfer the attack to softer targets abroad. Chapter 5 gives an in-depth treatment of this transference phenomenon. In the case of proactive policies, too little is done as countries wait for others to act. Given the suboptimality of counterterrorism responses to transnational terrorism, there is a need for international cooperation – the subject of Chapter 6.

PROACTIVE POLICIES

Proactive policies are offensive, since a government confronts the terrorists or their supporters directly. If action can curtail terrorists' resources, their finances, safe havens, infrastructure, or sponsors, then the ability of terrorists to engage in activities is curtailed. Terrorists' resources can be reduced by capturing or killing group members or by destroying their nonhuman resources – for example, weapons, ammunition, training camps, communication networks, or safe houses.

Consider the terrorist group's resource constraint,

$$P_T T + P_N N = I, \tag{1}$$

where P_T and P_N are the unit costs of generic terrorist (T) and nonterrorist (N) actions, respectively, and I is the group's income or resources for the current period. During each period, equation (1) indicates that the terrorist group allocates its resources between terrorist and nonterrorist activities, thereby exhausting its resources for the period. This constraint is displayed as AB in Figure 4.1, where terrorist attacks are measured along the y-axis (vertical axis) and nonterrorist attacks along the x-axis

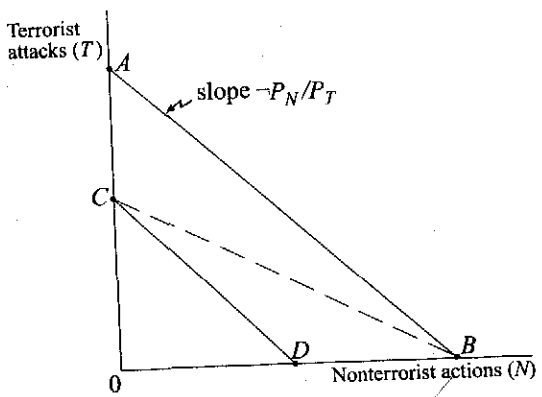

Figure 4.1. Terrorists' resource constraints.

(horizontal axis). If the terrorists devote all of their resources to terrorist attacks, then they can accomplish at most I/P_T attacks, which is found by setting $N = 0$ and solving for T in equation (1). As such, I/P_T represents the y-intercept of resource constraint AB. Similarly, the x-intercept, I/P_N, of constraint AB is found by setting $T = 0$ and solving for the maximal number of nonterrorist attacks in equation (1). To find the slope of the resource constraint, we rewrite it, by solving for T, as

$$T = \left(\frac{I}{P_T}\right) - \left(\frac{P_N}{P_T}\right) N. \tag{2}$$

The coefficient, $-P_N/P_T$, in front of N is the slope of the resource constraint, which indicates the change in T resulting from a unit change in N. Some proactive measures may reduce terrorists' resources, thereby shifting the resource constraint down in a *parallel* fashion to CD. The downward shift is parallel because a fall in I does not affect the ratio of unit costs in equation (2), thereby leaving the constraint's slope, $-P_N/P_T$, unchanged. Each intercept – I/P_T and I/P_N – falls by the same amount as I is reduced.

Proactive policies may, instead, raise the price of terrorist actions by making such activities more risky, thereby pivoting the resource constraint down in a nonparallel fashion to dashed line CB, if terrorists' resources are unaffected.[3] For example, the risk of being infiltrated by the government makes terrorist acts more costly without necessarily changing the terrorists' resource endowments. Group infiltration increases the relative attractiveness of nonterrorist acts. Finally, if the proactive measures raise the unit cost of terrorism and also reduce terrrorists' resources, then the resource constraint shifts downward in a nonparallel fashion (not shown) from AB, so that there is a greater fall in the y-intercept compared to the x-intercept of the new resource constraint. In any of these scenarios, proactive policies reduce the terrorists' choices and may result in reduced levels of both kinds of activities. When the governmental policy increases the relative costliness of terrorist actions, the tendency is for terrorists to switch to nonterrorist activities. If, however, a threatened government represses freedoms and raises the unit costs of nonterrorist acts, including legitimate protests, then the government may force the terrorists to rely on terrorism to a greater extent (Frey, 2004; Frey and Luechinger, 2003; Lichbach, 1987).

[3] As P_T rises alone from the proactive policy, the intercept along the y-axis falls from A to C in Figure 4.1.

Proactive policies can assume many forms, including a retaliatory raid against a state sponsor that provides resources, training, safe haven, logistical support, or intelligence to a terrorist group. An example of such a raid was the US bombing of targets in Libya on 15 April 1986 for its alleged involvement in the terrorist bombing of the La Belle discotheque in West Berlin on 4 April 1986, where 3 died and 231 were wounded, including 62 Americans.[4] Targets in the US raid included the Azizyah barracks in Tripoli, the Jamahiriyah barracks in Benghazi, the Sidi Bilal port west of Tripoli, the military side of the Tripoli airport, and the Benina military airfield.[5] The Azizyah barracks was the residence of Muammar Qaddafi. During the raid, two of his sons were seriously injured and his adopted one-year-old daughter was killed. Another example of a retaliatory raid was the Israeli attack against Palestine Liberation Organization (PLO) bases in Syria in response to the Black September attack on Israeli athletes at the 1972 Olympic Games.

Another type of proactive response is a preemptive attack against a terrorist group or a country harboring it, as in the case of 7 October 2001 US attack on the Taliban and al-Qaida in Afghanistan. A preemptive attack differs from a retaliatory raid because the former is more sustained and intended to severely compromise the capabilities of the terrorists. In June 2005, the US and Pakistani military were still attacking al-Qaida leaders and members in Afghanistan and Pakistan. Israeli assassinations of Hamas leaders and operatives in 2003 and 2004 also represent preemptive actions. Many past retaliatory raids merely lashed out at the terrorists or their sponsors without greatly limiting their ability to operate (see remarks in Chapter 3). As such, these raids served more as a vehicle for the government to send a signal to its citizens than as punishment for the culprits.

Less drastic but effective proactive measures include infiltrating the terrorist group and gathering intelligence. Infiltration can compromise the group's security and lead to arrests. To limit these consequences in light of the Red Brigades' experience, many terrorist organizations now rely on a cellular structure, where members know little about the identities of others outside of their small cell of four to six persons. The use of bloodlines and long-term friendships limits the possibility of infiltration. Effective intelligence can identify planned attacks and allow for countermeasures. Another proactive policy is to go after the financial resources

[4] Details of the La Belle discotheque bombing can be found in Mickolus, Sandler, and Murdock (1989, vol. 2, pp. 365–7).

[5] Details of the US raid are contained in ibid., pp. 373–4.

of the terrorists by freezing assets. Since 9/11, countries have frozen $200 million of terrorists' alleged assets (White House, 2003). At the international level, freezing assets raises problems of international cooperation addressed in Chapter 6 and in Sandler (2005).

George W. Bush's war on terror is a broad-based action that involves both proactive and defensive measures to protect the country and its citizens at home and abroad against terrorism. There is, however, a reliance on military power and proaction. The motivation for this extreme response is a realization that modern-day terrorism is a form of asymmetric warfare in which the terrorists rely on unconventional, irregular, and decentralized methods to confront a superior adversary – that is, the military and police of targeted industrial nations.[6] To counter the terrorist threat, the government deploys its military to destroy terrorists' bases of operation and assets. There are criticisms leveled against a military response (see, for example, Wilkinson, 2001). By characterizing the response as a war, the proactive government gives a false impression of a possible victory in which terrorism is eventually defeated. Some groups or sponsors may indeed be defeated or severely compromised, but terrorism, especially transnational terrorism, remains a tactic that will be embraced by new members and groups. Any "victory" will be temporary. A military response may also result in collateral damage to innocent individuals – for example, the victims of a smart bomb that misses its mark. In addition, a military response may turn world opinion against the offensive country if operations appear excessive or brutal. One of the greatest drawbacks is the possibility that a military response will attract new recruits to the cause, which, in turn, could result in a wider conflict.[7]

There is also the problem of measuring success associated with military operations. Following the October 2001 preemptive strikes by coalition forces in Afghanistan, there were al-Qaida-linked attacks in 2002 and thereafter – for example, the 12 May 2003 suicide truck bombings in Riyadh, Saudi Arabia, and the 16 May 2003 suicide car bombings in Casablanca, Morocco – that led critics to conclude that the Afghan war of

[6] This characterization comes from Schulze and Vogt (2003).

[7] To date, there are few theoretical analyses of the process of recruitment to terrorist organizations. Recruitment can be stimulated by past incident successes or by governments' draconian measures (see, for example, Rosendorff and Sandler, 2004). To properly address recruitment, a multiperiod dynamic model is required, whereby terrorist attacks and government countermeasures influence the stock of operatives in a terrorist campaign. This stock is also affected by retirements and casualties incurred in missions. The government must be sufficiently vigilant to limit successful incidents, but not so harsh as to encourage grievances and new recruits.

2001 did not achieve much. What we cannot know is how many additional attacks would have occurred had action not been taken in Afghanistan. This counterfactual problem is particularly acute with military operations because of the mistaken expectation that terrorism will cease. Measurement is also difficult owing to the cyclical nature of terrorist attacks; a lull may be due to a natural cycle rather than military actions taken. And fewer attacks may not even signal success, if attacks become bloodier or are transferred to other countries.

Proactive measures often represent pure public goods as defined in Chapter 1. A preemptive operation that reduces the capabilities of a common terrorist threat *confers nonexcludable and nonrival benefits on all potential targets.* If asked to contribute to the operation after the fact, most targets will understate their true derived benefits so as to free ride on the support of others. This tendency will lead to underprovision as targets wait for others to act. At the national level, the free-rider concern is addressed by assigning to the central government the authority to protect domestic targets with financing from tax revenues. When necessary, the central government coordinates the state and local jurisdictional responses. The free-rider problem is a major worry for combating transnational terrorism, because there is no supranational government that can provide a unified proactive policy *underwritten by taxes from target countries*. Since 9/11, the world community has relied on the United States to coordinate the proactive response, which other nations can voluntarily support. At the transnational level, some proactive policies may result in public bads as costs are imposed on other countries. If, for example, a proactive operation augments grievances and leads to recruitment of terrorists, then these public costs must be weighed against the public benefits in order to ascertain the net consequences (Rosendorff and Sandler, 2004). A particularly heavy-handed operation may conceivably do more to jeopardize other countries than to safeguard them. This is particularly true when the proactive country is also hardening its own targets at home so that grievance-inducing terrorist attacks occur abroad, where other interests are impacted. The result is a "forced ride," where a nation endures a consequence that it prefers to forgo (Tanzi, 1972).

DEFENSIVE POLICIES

Defensive measures protect potential targets either by making attacks more costly for terrorists or by reducing their likelihood of success. When an attack occurs, effective defensive action also limits the losses. Many

defensive policies are reactive in the sense of being imposed after past incidents reveal vulnerabilities. The installation of metal detectors to screen passengers at airports is an instance. Prior to their installation on 5 January 1973 at US airports, there were on average approximately twenty-seven hijackings each year in the United States (Enders, Sandler, and Cauley, 1990a, p. 95). The installation of bomb-sniffing equipment to screen luggage on commercial flights came after bombs brought down planes – for example, Pan Am flight 103 over Scotland on 21 December 1988 and UTA flight 772 over Niger on 19 September 1989. Both metal detectors and bomb-sniffing devices are examples of technological barriers, which are especially effective when authorities continuously upgrade the technology to stymie attempts by terrorists to circumvent the barriers – for example, the development of plastic guns or non-nitrogen-based explosives.

Some defensive actions may involve hardening a target, such as efforts in 1976 and 1985 to fortify US embassies. Since the 19 April 1995 bombing of the Alfred P. Murrah Federal Building in Oklahoma City, barriers have been put around other federal buildings to create a safety perimeter to curtail the damage from a car or truck bomb. The decision to allow fighter jets to shoot down hijacked planes that could be used to destroy buildings as on 9/11 is another defensive policy. The deployment of sky marshals on airplanes is yet another defensive action, as are DHS terror alerts to warn the public of a heightened state of risk.

Some actions are intended to deter or hinder an attack by stiffening penalties for convicted terrorists. For example, the so-called Reagan get-tough policy on terrorism was expressed in two public laws (PL) passed by the US Congress and signed by President Reagan. These laws are PL 98–473 (signed on 12 October 1984) and PL 98–533 (signed on 19 October 1984). The first required up to life imprisonment for individuals taking US hostages, either within or outside the United States. Penalties for destroying aircraft or airport facilities within the United States were also raised, as were penalties for acts committed with a bomb or other weapon on a US aircraft. The second bill authorized the US attorney general to pay rewards for information leading to the apprehension or conviction, inside or outside the United States, of terrorists who targeted US interests (Pearl, 1987, p. 141; Mickolus, Sandler, and Murdock, 1989).

At the international level, the United Nations and other multilateral bodies (for example, the International Civil Aviation Organization, the International Maritime Organization, and the Council of Europe) have passed conventions and treaties outlawing certain acts of terrorism – for

example, seizure of commercial aircraft, the taking of hostages, and the use of explosive bombs. Unlike domestic laws, these international conventions suffer from the absence of an enforcement mechanism. In Chapter 6, we present an evaluation of their effectiveness.

Effective defensive measures have a public good aspect that generally differs from proactive policies. A defensive action may deflect an attack from a hardened to a softer target and, in so doing, impose a public cost on other potential targets; thus, a negative externality is associated with this transference. Unlike proactive measures, which may be undersupplied, defensive measures may be oversupplied.

GAME THEORY PRIMER

We now apply simple game theory to compare and contrast how national governments strategically interact with one another in a noncooperative framework that involves acting independently to decide their counterterrorism policies. The need for cooperative behavior for some transnational interactions then becomes apparent. A noncooperative game is fully identified by four factors: the rules of the game, the set of players, their available strategies, and the payoffs for all possible strategy combinations. To simplify the analysis, we display games in their normal or matrix form as described below.

The Prisoners' Dilemma game is relevant for many antiterrorism decisions and is thus described in detail. A story line behind the Prisoners' Dilemma game is as follows. In the vicinity of an armed robbery, two individuals in a vehicle are stopped on suspicion of being involved. Not only do the suspects appear to match eyewitnesses' vague descriptions, but a search of their car turns up an unregistered handgun. The district attorney realizes that she has insufficient circumstantial evidence to convict them of the robbery unless she can get a confession from one of the suspects. Without a confession, she can only convict them of possessing an unregistered handgun, which carriers a one-year sentence. Her strategy is to separate the two suspects and offer each a deal. If just one of them confesses, then the confessor walks free, while the nonconfessor receives the maximum four-year sentence for the robbery. If both confess, then they each receive a reduced two-year sentence for cooperating with the district attorney.

In panel *a* of Figure 4.2, the relevant payoffs for the two suspects – prisoners *A* and *B* – are displayed in the four cells of the game box, where each prisoner has two strategies: confess or not confess. Given that each

A \ B	Confess	Does not confess
Confess	**2 years, 2 years**	0 years, 4 years
Does not confess	4 years, 0 years	1 year, 1 year

a. Prisoners' Dilemma in jail sentence terms

A \ B	Confess	Does not confess
Confess	**2, 2**	4, 1
Does not confess	1, 4	3, 3

b. Prisoners' Dilemma in ordinal form

Figure 4.2. Prisoners' Dilemma.

player has two choices, there are four possible strategy combinations for the two suspects: both confess, in the top left-hand cell; *A* confesses alone, in the top right-hand cell; *B* confesses alone, in the bottom left-hand cell; and neither confesses, in the bottom right-hand cell. In each of the four cells, the first payoff or prison sentence is that of prisoner *A* or the row player, whereas the second payoff is that of prisoner *B* or the column player. The payoffs in each cell correspond to those associated with the deal offered by the district attorney – for example, when both confess, they each receive a two-year term. To examine the strategic dilemma from *A*'s viewpoint, we must compare his payoffs from his two strategies. When prisoner *B* confesses, prisoner *A* gets a lighter sentence of two years by confessing, as compared to the maximum four-year sentence for not confessing. If, however, prisoner *B* does not confess, prisoner *A* is still better off by confessing, since he then is released rather than serving a one-year term for not confessing. Prisoner *A*'s payoffs in the confessing row are better than the corresponding payoffs in the not confessing row. A strategy such as confessing, which provides a greater payoff regardless of the other player's action, is a *dominant strategy* and should be played. By the same token, a strategy whose payoffs are less than some other strategy's corresponding payoffs is said to be a *dominated strategy* and should *not* be chosen. In panel *a* of Figure 4.2, suspect *B*'s dominant strategy is also to confess when the corresponding payoffs in the two columns are compared – that is, a two-year sentence is better than four

years, and walking free is better than a one-year term. As both suspects apply their dominant strategies, the outcome is mutual confession with two years of jail time. The dilemma arises because keeping silent is better for both suspects.

The confession outcome represents a *Nash equilibrium* (with boldfaced payoffs), which is a collection of strategies – one for each player – such that no player would *unilaterally* alter his or her strategy if given the opportunity.[8] This can be seen by focusing on the confession cell in panel *a*, where both players confess. If suspect *A* (or *B*) alone changes to not confessing or withdrawing the confession, then this suspect's payoff is worsened by the addition of two years of jail time. As a consequence, the suspect will not change his or her strategy unilaterally. Of course, both suspects would have been better off if they had formed an agreement from the outset to stay silent and had stayed with the arrangement. Even if such an agreement had been made, problems arise when the district attorney tempts them separately with the deal. Given the dominant strategy that her deal places before each suspect, neither can be sure what the other will do – promise to keep silent or no promise. Even if suspect *A* is sure that *B* will not confess, *A* is better off confessing and playing his buddy for a sucker.

An alternative representation of the payoffs in panel *a* of Figure 4.2 distinguishes the so-called Prisoners' Dilemma from myriad other payoff configurations. This is done by rank ordering the payoffs from best to worst in panel *b* of Figure 4.2. The best payoff (the walk-free sentence) is assigned the highest ordinal rank of 4, the next-best payoff (the one-year sentence) is given an ordinal rank of 3, and so on. Any two-person game box that possesses precisely the same ordinal payoff array as in panel *b* is a Prisoners' Dilemma. There are seventy-eight distinct 2 × 2 arrays of ordinal payoffs, but only one of them corresponds to the Prisoners' Dilemma. The ordinal depiction captures the essential strategic features of the game, including the presence of dominant strategies and Nash equilibrium(s). In panel *b*, confessing remains the dominant strategy, since $2 > 1$ and $4 > 3$; and mutual confession is the Nash equilibrium, whose payoffs are boldfaced. If the columns and rows are interchanged so that confess is in the bottom row for *A* (left column for *B*), then a Prisoners' Dilemma still results, with the (3, 3) payoffs switching position with the (2, 2) payoffs along the diagonal, and the (1, 4) and (4, 1) payoffs switching positions along the off-diagonal.

[8] Another characterization of a Nash equilibrium is that each player chooses his or her best strategy as a counter to the other player's best response or strategy.

		B: Straight	B: Swerve
A	Straight	1, 1	**4, 2**
A	Swerve	**2, 4**	3, 3

a. Chicken game in ordinal form

		B: Does not retaliate	B: Retaliate
A	Does not retaliate	**2, 2**	3, 1
A	Retaliate	1, 3	**4, 4**

b. Assurance game in ordinal form

Figure 4.3. Chicken and assurance games.

Before we apply game theory to the analysis of antiterrorist policy choices, we examine two additional game forms. In panel *a* of Figure 4.3, we indicate the *chicken* game in ordinal form. The James Dean movie *Rebel without a Cause* popularized the game's story line of two hot rods speeding toward one another from opposite directions. Each driver – *A* and *B* – has two strategies – keep driving straight or swerve to avoid a collision. The payoffs reflect the following preferences. The greatest perceived payoff derives from driving straight when the other driver swerves, because the driver who holds the course appears strong to his peers. The next-best payoff occurs when both drivers swerve, which is better than swerving alone and being branded the "chicken." Of course, the worst outcome is for both drivers to hold their course and have a collision. This game has no dominant strategy: the payoffs associated with swerving are not both greater than the corresponding payoffs associated with driving straight, since $2 > 1$ but $3 \not> 4$. Similarly, the driving-straight strategy does not dominate swerving, insofar as $4 > 3$ but $1 \not> 2$. Nevertheless, there are two Nash equilibriums indicated in boldface, where a single driver swerves. At these equilibriums, neither player would unilaterally change his or her strategy. From an ordinal viewpoint, chicken and Prisoners' Dilemma differ by having the 1s and 2s switch positions. This small change has large strategic consequences – the failure to coordinate the proper response can be disastrous for chicken. A situation in which taking no

action against a terrorist threat spells disaster may be characterized as a chicken game.

An *assurance* game is indicated in panel *b* of Figure 4.3, where two countries – *A* and *B* – must decide whether or not to retaliate against an alleged state sponsor of terrorism following some spectacular terrorist incident that creates grave losses for both countries. The ordinal payoffs in panel *b* of Figure 4.3 differ from those of the Prisoners' Dilemma in panel *b* of Figure 4.2 in one essential way: the 3s and 4s have switched positions, so that the greatest ordinal payoff comes from joint action, while the next-best payoff arises from free riding. To obtain this game, we assume that both countries *must join* forces to get the job done – a single retaliator cannot hurt the terrorists sufficiently to outweigh the associated costs. Free riding on the country's retaliation effort is the second-best outcome, because revenge, though inadequate, is better than no response by anyone. Retaliating alone is the worst outcome, because it is costly without accomplishing a net positive payoff, despite some political gain from taking action. The second-smallest payoff is mutual inaction.

The assurance game in panel *b* of Figure 4.3 has no dominant strategy, because the payoffs in either row (column) are not both greater than the corresponding payoffs in the other row (column). There are, however, two Nash equilibriums whose payoffs are boldfaced along the diagonal of the game box, where countries match one another's responses – either no one retaliates, or both retaliate. If one country takes the lead and retaliates, as the United States did following 9/11, then the other country is better off retaliating, since an ordinal payoff of 4 is more desirable than one of 3. The game is called the *assurance game*, since – unlike the Prisoners' Dilemma, where agreements are not honored – pledged (assured) action will elicit a like response by the other player.

The heinous nature of the 9/11 attacks and its human toll on American and British citizens at the World Trade Center altered the ordinal payoffs depicted in panel *b* of Figure 4.3. For the United States and the United Kingdom, the worst payoff was associated with no one retaliating, followed by retaliating alone. That is, the 1s and 2s switch positions in panel *b* of Figure 4.3, while the 3s and 4s remain as displayed. The resulting game matrix (not shown) has a dominant strategy for both countries to retaliate. The sole Nash equilibrium is for joint retaliatory action, which began on 7 October 2001; thus, the Prisoners' Dilemma is not always descriptive of the decision to retaliate. If a country is sufficiently hurt in a terrorist attack, retaliation may be a compelling response.

PROACTIVE VERSUS DEFENSIVE POLICIES

For a proactive policy, we consider preemption when two targeted countries must decide whether or not to launch a preemptive attack against a common terrorist threat. The preemptive strike is intended to weaken the terrorists so that they pose a less significant challenge. Suppose that each country taking the preemptive action confers a public benefit of 4 on itself and the other country at a cost of 6 to itself. The game payoffs are indicated in the matrix of Figure 4.4. When no one acts, so that the status quo is preserved, nothing is gained. If, say, the United States (US) preempts but the European Union (EU) does not, then the US nets -2 $(= 4 - 6)$ as costs of 6 are deducted from benefits of 4, while the EU receives free-rider benefits of 4. The payoffs in the top right-hand cell are reversed as these roles are interchanged. When both countries preempt, each gains 2 as its preemption costs of 6 are deducted from benefits of 8 $(= 2 \times 4)$, derived from the preemptive efforts of both countries. If these payoffs are ordinally ranked, then the game is immediately identified as a Prisoners' Dilemma. The dominant strategy is to maintain the status quo (that is, $0 > -2$ and $4 > 2$), and the boldfaced Nash equilibrium is mutual inaction. Thus, a classic pure public good scenario emerges, with nothing happening as each country prefers to rely on the other.

In Figure 4.5, we extend this same scenario to six identical countries and examine the alternative outcomes from the viewpoint of nation *i*, whose payoffs are indicated. The columns denote the number of nations other than *i* that preempt. In the top row, nation *i* attempts to free ride.

		EU	
		Status quo	Preempt
US	Status quo	**0, 0**	4, −2
	Preempt	−2, 4	2, 2

Figure 4.4. Two-target preemption game.

	Number of preempting nations other than nation i					
	0	1	2	3	4	5
Nation *i* does not preempt	**0**	4	8	12	16	20
Nation *i* preempts	−2	2	6	10	14	18

Figure 4.5. Six-nation preemption game.

If, say, two other nations preempt, then i receives 8 ($= 2 \times 4$). In general, nation i gains 4 times the number of preemptors as a free-rider payoff. The bottom row displays i's payoff when it preempts. Nation i nets -2 when no other nation joins its efforts, while i receives 2 ($= 2 \times 4 - 6$) when one other nation also preempts. In general, nation i gains $4n - 6$, where n is the number of preemptors including i.

The dominant strategy for this six-nation preemption game is not to preempt, because each payoff in the top row is higher than the corresponding payoff in the bottom row by 2, or the net loss from independent action. The boldfaced Nash equilibrium is where no nation preempts, as all nations exercise their dominant strategy of doing nothing. This outcome leads to a significant welfare loss to the six-nation collective. If all six nations engage in preemption, then each gains 18 for a cumulative total of 108. Thus, all-round free riding loses society 108 of potential benefits in this example.[9] As the number of nations in the scenario increases, this cumulative loss increases. For a worldwide network such as al-Qaida, these losses from inaction can be extremely large; thus, the need for international cooperation is highlighted. This example raises some interesting questions. Why is there more preemption for domestic terrorism? What explains situations in which there is preemption in light of a transnational terrorist threat?

For domestic terrorism, the target nation cannot rely on other countries, since it alone is the target of attacks. Quite simply, there are no free-riding opportunities, except among targets within the nations. A centralized response addresses any free-riding concerns within a nation. Moreover, the individual benefits from action often exceed the associated costs once the terrorist campaign surpasses some level of intensity. Thus, the net gain from acting alone is likely to be positive, not negative. As the terrorists turn up the heat – for example, the Tupamaros in Uruguay at the start of the 1970s – their enhanced brutality raises the government's perceived benefits from preemption and makes the net gain from action larger. Another factor may be the government's perceived payoff from inaction. Thus far, we have assumed it to be 0. If, instead, the government loses support by not responding, then the resulting negative payoff may transform the game into a chicken game where some action is taken.[10]

[9] The social optimum does *not* correspond to the payoff of 20 in Figure 4.5 associated with i free riding on the other five nations. In this scenario, i receives 20, but each of the preemptors gains just 14 from its efforts and those of the other four preemptors (see Figure 4.5). Society nets 90 [$= 20 + (5 \times 14)$] instead of 108.

[10] This is the case when the losses from inaction exceed in absolute value the net loss from acting alone.

		EU: Status quo	EU: Preempt
US	Status quo	0, 0	4, −2
	Preempt	**2, 4**	6, 2

Figure 4.6. Asymmetric preemption game.

For transnational terrorism, there are at least two strategic reasons for a nation to take preemptive measures. First, the underlying game form may be something other than the Prisoners' Dilemma – for example, chicken or assurance. If the terrorist campaign is sufficiently deadly, doing nothing may be politically unacceptable (for example, following 9/11 or the train bombings in Madrid on 11 March 2004), so that the maintenance of the status quo, where terrorists attack with impunity, may have high political costs. Second, the countries' payoffs may be asymmetric owing to the terrorists' targeting preferences. Consider the asymmetric preemption game in Figure 4.6 between the US and the EU. The payoffs for the EU are identical to those of Figure 4.4 – that is, it gains 4 from its own preemption or that of the US and must pay a cost of 6 when preempting. The US now gains more from its *own* preemption than it derives from EU preemption, because US action demonstrates to its citizens that it is striking back. US action still costs 6. Suppose that the US still derives just 4 in benefits from EU preemption but 8 from its own efforts. US payoffs in the bottom row are now 2 ($= 8 - 6$) and 6 ($= 8 + 4 - 6$) for acting alone and in unison, respectively. The dominant strategies in Figure 4.6 is for the US to preempt ($2 > 0$ and $6 > 4$ for the row payoff comparison) and for the EU to do nothing ($0 > -2$ and $4 > 2$ for the column payoff comparison).

The Nash equilibrium in Figure 4.6 involves the US preempting and the EU free riding. This example is not intended to point the finger at any country; rather, it indicates that a prime-target nation can be induced to preempt even if it has to do so alone. Only these prime targets may be sufficiently motivated to provide benefits to all potential targets by going after a common threat. This reaction is analogous to the situation where nations become more proactive for domestic terrorism once home attacks surpass a certain threshold. Despite US rhetoric prior to 9/11, it had seldom engaged in preemption, even through its interests sustained 40% of all transnational terrorist incidents. The 15 April 1986 Libyan retaliatory raid was a short-lived operation, as were the Clinton administration's

US \ EU	Deter	Status quo
Deter	−2, −2	2, −4
Status quo	−4, 2	0, 0

Figure 4.7. Two-target deterrence game.

20 August 1998 strikes on Afghanistan and Sudan for their alleged involvement in the bombing of the US embassies in Tanzania and Kenya on 7 August 1998. There is a certain irony in this preemption asymmetry. Had the terrorists treated their targets more symmetrically and not concentrated attacks on a few countries' assets, no country would have resorted to preemption. Of course, the terrorists focus their attacks in order to win over a following by trading preemption risk off against the followers' support.

When two or more target countries engage in preempting the same terrorist threat, their level of action will be negatively related because preemption is a substitute – one country's action limits the need for the other to act (Sandler and Siqueira, 2005). Thus, prime targets easy ride on the preemption of others, which implies too little preemption unless decisions are made in a cooperative framework. If, for example, one country experiences more attacks, it will increase its preemption, which will decrease the other country's efforts. This is an instance where countries work at cross purposes when deciding upon antiterrorist activities.

Deterrence and Other Defensive Measures

For deterrence, a nation tries to limit terrorist attacks by making potential targets less vulnerable through protective measures.[11] A symmetric two-target – US and EU – deterrence game is displayed in Figure 4.7, in which each country can do nothing or deter an attack by hardening its

[11] We do not use deterrence in the Cold War sense of keeping an action from occurring through a threat of punishment that is also costly to the punisher. We instead use deterrence in its common definitional sense of dissuading an action. This is how it has been applied in the terrorism literature since Landes (1978), where deterrence affects the terrorists' constraint.

targets. Increased deterrence is assumed to give a private, country-specific gain of 6 to the deterring country at a cost of 4 *to both countries*. For the deterring country, costs arise from both the expense of deterrence and the increased likelihood of incurring damage to its assets abroad if the attack is deflected there. For the nondeterring country, the costs stem from the heightened risk that it assumes because it is now a relatively soft target that may draw the attack.

The payoffs in the matrix in Figure 4.7 are based on this scenario. If the US deters alone, it gains a net benefit of 2 (= 6 − 4) as its deterrence gains are reduced by the associated costs. The EU suffers external costs of 4 from attracting the attack. The payoffs are reversed when the roles are interchanged. If both countries deter, then each sustains a net loss of 2 [= 6 − (2 × 4)] as costs of 8 from both countries' deterrence are deducted from the deterrence benefits of 6. The status quo provides no gains or losses. The game is a Prisoners' Dilemma with a dominant strategy to deter and a Nash equilibrium of mutual deterrence. If this game were extended to n countries, then all countries would choose their dominant strategy to deter. Overdeterrence results as each country does not account for the external costs associated with its efforts to deflect the attack abroad. Globalization may reduce overdeterrence somewhat by tying countries' vulnerabilities together.

Countries' deterrence choices are usually complementary, since greater deterrence abroad encourages greater deterrence at home so as not to draw the attack. Defensive policies such as deterrence and proactive policies such as preemption may both result in a Prisoners' Dilemma when displayed as a simple game. Nevertheless, there are subtle, but crucial, differences. First, proactive decisions tend to be substitutes and undersupplied, while defensive decisions tend to be complements and oversupplied. Second, a greater variety of game forms is typically related to proactive policies (for example, Prisoners' Dilemma, chicken, assurance, and asymmetric dominance), while the Prisoners' Dilemma is typically tied to defensive policies (Arce and Sandler, 2005). Third, globalization may ameliorate the oversupply of defensive measures by making people equally vulnerable everywhere, whereas it may exacerbate the undersupply of proactive measures. Fourth, defensive measures may give rise to both negative and positive external effects. That is, deterring an attack by deflecting it abroad may result in external costs in the recipient country but external benefits to foreign residents in the deterring country. Proactive measures are typically associated with external benefits unless they create grievances and recruitment.

		EU: Deter	EU: Status quo	EU: Preempt
US	Deter	**−2, −2**	*2, −4	6, −6
US	Status quo	−4, 2	0, 0	4, −2
US	Preempt	−6, 6	−2, 4	2, 2

Figure 4.8. Deterrence versus preemption – symmetric case.

The Choice between Deterrence and Preemption

We next examine the scenario where each of two targets – the US and the EU – must choose between deterrence and preemption.[12] Each target now has three strategies: deter, maintain the status quo, and preempt. The scenarios for deterrence and preemption are identical to the previously described 2 × 2 games in Figures 4.4 and 4.7, respectively. Thus, deterrence provides public costs of 4 to the two targets and a private benefit of 6 to the deterrer, while preemption provides public benefits of 4 to the two targets and a private cost of 6 to the preemptor. These payoffs are illustrative – any set of public and private benefits where the private benefit of deterrence exceeds the associated costs and the private cost of preemption exceeds the associated benefits will give the outcome presented. This pattern of payoffs ensures that each component 2 × 2 game is a Prisoners' Dilemma.

The 3 × 3 game matrix is displayed in Figure 4.8, where the embedded deterrence game is captured by the northwest bold-bordered 2 × 2 matrix, and the embedded preemption game is captured by the southeast bold-bordered 2 × 2 matrix. Only the payoffs in the two cells at the opposite ends of the off-diagonal need to be derived. If one target deters and the other preempts, then the deterrer gains 6 (= 6 + 4 − 4), while the preemptor nets −6 (= 4 − 6 − 4). The deterrer earns a private benefit of 6 from its deterrence and a public benefit of 4 from the other target's preemption, but must cover its deterrence cost of 4. The sole preemptor suffers a cost of 4 from the other player's deterrence and a cost of 6 from its preemption efforts, but achieves only a private preemption benefit of 4.

The Nash equilibrium for the embedded deterrence game is for both countries to deter, and that for the embedded preemption game is for both

[12] Material in this section draws from the analysis in Arce and Sandler (2005).

to take no action. Which of these two equilibriums, if any, now reigns in the 3 × 3 game scenario? For the US, the dominant strategy is to deter, since its payoffs in the top row are greater than the corresponding payoffs in the other two rows. Similarly, the EU's dominant strategy is also to deter when its column payoffs (the right-hand payoff in a cell) are compared to the corresponding payoffs in the other two columns. As both targets apply their dominant strategies, the Nash equilibrium of mutual deterrence results; thus, the deterrence equilibrium wins out. This outcome is unfortunate for two reasons. First, payoffs in the status quo outcome are higher for both targets than those in the mutual deterrence equilibrium. Second, the sum of payoffs from mutual deterrence is the *smallest* of the nine strategic combinations! Pursuit of one's self-interest by playing the dominant strategy leads to the worst social outcome in terms of total payoffs. If a nation has a choice between deterrence and preemption, deterrence often wins out – a situation reflective of nations' tendencies when confronting transnational terrorists to rely on defensive measures to deflect attacks rather than to go after the terrorists directly. This means that coordinating counterterrorism policies among countries can lead to significant gains. Elsewhere, Arce and Sandler (2005) examined alternative game forms – chicken, assurance, and others – when countries choose between defensive and proactive policies and demonstrated the general robustness of the tendency for targets to rely on defensive measures in symmetric scenarios. They also allowed governments a fourth option to use both deterrence and preemption to varying degrees. Once again, the sole reliance on deterrence wins out.

We next permit an asymmetric response for preemption identical to the earlier analysis, so that the southeast 2 × 2 matrix in Figure 4.9 is that of Figure 4.6. The northwest 2 × 2 deterrence matrix in Figure 4.9 is that of Figure 4.7. In terms of underlying payoffs, all that changes in Figure 4.9 compared to the symmetric scenario is that the US derives 8,

		EU: Deter	EU: Status quo	EU: Preempt
US	Deter	**−2, −2**	2, −4	6, −6
US	Status quo	−4, 2	0, 0	4, −2
US	Preempt	**−2, 6**	2, 4	6, 2

Figure 4.9. Deterrence versus preemption – asymmetric case.

rather than 4, in benefits from its own preemption owing to its prime-target status. Thus, only the US payoffs in the bottom row differ from those in Figure 4.8 by being 4 larger. The EU still has a dominant strategy to deter, so the only possible Nash equilibriums must be in the first column, where the EU deters. Given the payoffs of the specific example, there are now two boldfaced Nash equilibriums, where either both targets deter or the US preempts and the EU deters. If, however, the US receives even more benefits from its preemption, then the outcome will have the US preempting while the EU deters. After 9/11, US reliance on defensive measures would merely transfer the attack abroad, where its people and property are still targeted, thus limiting US gains from such reliance.

All of these simple games are conceptually enlightening in explaining why preferred-target countries resort to proactive *and* defensive measures against transnational terrorism, while less-targeted countries focus on defensive actions. In the latter case, the countries' assets may be hit abroad, but since their interests are not sought out per se by the terrorists, this likelihood remains small. Such countries are content to let some more at-risk country root out the terrorists and put its soldiers in harm's way to make the world safer. These strategic incentives bode ill for international cooperation and a united stance against transnational terrorism.

WEAKEST-LINK CONSIDERATIONS

In some cases, risks are interdependent so that securing one vulnerability without securing another does not achieve much (if any) safety.[13] Consider upgrades to airport screening to counter terrorists' ability to circumvent current measures. Suppose that the screening upgrade is introduced in just one of two vulnerable airports. The risk to the flying public may not be curtailed, because the terrorists can exploit the vulnerability at the other location where the device is not installed. The security upgrade is a *weakest-link public good*, whose effective supply is measured by the smallest provision level (Hirshleifer, 1983).

Consider the game depicted in Figure 4.10, where each target has two strategies: introduce a security upgrade to its airport screening or maintain current screening devices and procedures. Further suppose that the upgrade costs 6 but provides benefits of 8 to each country only when *both* targets adopt the upgrade. Unilateral adoption implies costs of 6 with no

[13] Interdependent risk is analyzed in Heal and Kunreuther (2003, 2005) and Kunreuther and Heal (2003).

		EU: Status quo	EU: Security upgrade
US	Status quo	**0, 0**	0, −6
	Security upgrade	−6, 0	**2, 2**

Figure 4.10. Weakest-link security risk.

benefits. The resulting game is an assurance game. In Figure 4.10, there is no dominant strategy, because the payoffs in either row (column) are not both greater than those in the other row (column). There are, however, two Nash equilibriums along the diagonal where strategy choices are matched – either no upgrade is introduced, or both airports adopt the upgrade. Obviously, the mutual-upgrade equilibrium improves the well-being of both targets over the status quo. If the US leads and adopts the upgrade, then the EU is better off doing the same (a payoff of 2 exceeds that of 0). Matching behavior is the hallmark of weakest-link public goods, since it is senseless to exceed the smallest level of such goods: doing so incurs extra costs with no added benefits.

Next consider the case where each of two targets must choose among five levels of upgrade (including no upgrade), where each incremental upgrade gives 8 in additional benefits to both countries only when matched by the other player. Once again, suppose that every upgrade costs 6. The resulting game can be displayed in a 5×5 matrix (not shown) where all of the Nash equilibriums are along the diagonal where upgrade levels are matched. If, for example, each country adopts three upgrade levels, then each gains a net payoff of 6. Suppose that one target country has more-limited means than another. This country chooses the security level that it can afford, which may be a rather low standard of safety. The wealthier country can either match this level or subsidize the security upgrade of the other country.[14] If the level chosen by the poorer country is unacceptable to the richer country, then fostering the former's security is the logical choice. One of the four pillars of US counterterrorism policy is to "bolster the counterterrorist capabilities of those countries that work with the United States and require assistance" (US Department of State, 2003, p. xi). If, instead, two hundred countries must provide a weakest-link

[14] For an analysis of in-kind transfers of weakest-link public goods, see Vicary (1990) and Vicary and Sandler (2002).

security activity, then shoring up the many weakest links becomes an expensive proposition that we address in Chapter 6.

For domestic terrorism, the weakest-link issue is addressed by having the central government impose and coordinate acceptable standards countrywide. The training and deployment of professional federal screeners responded to the obvious vulnerabilities at Logan, Newark, and Dulles Airports demonstrated on 9/11. The creation of the Department of Homeland Security (DHS) was motivated, in part, by the goal of achieving acceptable levels of interdependent security risks countrywide.[15]

Interdependent risks abound in the study of counterterrorism. Many defensive actions involve such risks – for example, screening luggage transferred between airlines and airports, limiting the vulnerability of a network, and guarding ports of entry. Although weakest-link public goods tend to be tied to defensive measures, they may occasionally be associated with a proactive policy. For example, the least discreet intelligence-gathering operation may jeopardize everyone's efforts by putting the terrorists on notice. Moreover, efforts to freeze terrorists' assets can be severely compromised by inadequate action at some financial safe havens.

In some situations, the concept of a *weaker-link public good* may apply if efforts above the lowest level add some benefits to a counterterrorist action. If, on average, more luggage is transferred at airport *A*, then extra measures there may compensate somewhat for lower standards elsewhere. At a few airports, efforts to rescreen all transferred luggage limit interdependent risks and provide for greater payoffs from higher levels of vigilance. With weaker-link public goods, equilibriums may include some nonmatching policy combinations. The extent of nonmatching outcomes hinges on the degree to which extra efforts at one venue can compensate for inadequate actions elsewhere.

BEST-SHOT CONSIDERATIONS

Some counterterrorism policies are *best-shot public goods*, where the largest provision amount determines the benefits to all potential targets. Again, consider the case of transnational terrorism in which countries are confronted with a threat from the same terrorist network. The gathering of intelligence and the infiltration of the network – two proactive

[15] How well interdependent security risks are reduced in practice also depends on the screening technology given to the professional screeners. US government reports released in 2005 reveal that screening still has significant vulnerabilities as privacy is preserved.

		EU: Status quo	EU: Innovate
US	Status quo	0, 0	**6, 2**
	Innovate	**2, 6**	2, 2

Figure 4.11. Best-shot security innovation.

measures – are often best-shot public goods whose benefits depend on the greatest effort. If, for example, the group is infiltrated, its security is compromised and the group presents a reduced threat for all targets. Often the greatest effort accomplishes this outcome; additional effort by others once the group is infiltrated adds no extra benefits. Another example is the development of a security innovation, such as stun grenades or a bomb-sniffing device. The best-performing innovation will be adopted by all at-risk nations; less adequate or identical innovations offer no additional benefits.

In Figure 4.11, we display a security-innovation game where each of two targets can maintain the status quo or discover a security breakthrough that can protect both targets. Suppose that the innovation costs the innovator 4 and provides benefits of 6 to each potential target. Further suppose that a second discovery of this innovation costs the discoverer 4, but yields no further benefits. In the game box, the sole innovator nets 2, while the other target gains a free-rider benefit of 6. If both innovate, then each receives just 2, as each must cover its innovation costs. The same kind of payoff scenario characterizes infiltrating a group, because a second infiltration is costly but does not necessarily weaken the terrorist group any more than the first. The same is true of redundant intelligence.

There is no dominant strategy in the two-target innovation game, but there are two Nash equilibriums in cases where there is a sole innovator. The boldfaced payoffs for these equilibriums lie along the off-diagonal. If the innovation scenario involves, say, twenty countries, then the equilibriums consist of just one country making the discovery and the others adopting it. The resulting game is a *coordination* game in which the countries must tacitly decide who is to expend the effort so that resources are not wasted in duplication. Often the innovation or group infiltration comes from the most threatened country. If the required effort is sufficiently large to surpass the capabilities of the prime-target country, then international cooperation and a pooling of effort may be necessary.

For domestic terrorism, the coordination is achieved by the central government orchestrating efforts to eliminate duplication. The rationale behind the creation of an intelligence czar and a single entity to coordinate the different intelligence-gathering agencies in the United States is to limit duplication and increase efficiency. Private firms play an essential role in developing technological innovations useful to counterterrorism. At times, their research and development are subsidized by the government in order to reduce investment risk to the firm. The best technology can then be sold by the firms to governments worldwide to increase safety. Currently, firms are developing biofeedback screening devices that can identify people based on their eyes or other unique features.

GETTING AT THE ROOTS OF TERRORISM

Another counterterrorism action is to address the grievances of the terrorists, thereby eliminating their rationale for violence. There are a number of difficulties with accommodating terrorists' demands. First, such accommodations may induce countergrievances and a new wave of terrorism from those who are harmed by the government's concessions. Second, granting concessions sends the message that violence pays and will encourage more terrorism. When deciding between legal and terrorist means, a terrorist group accounts for the likelihood of success of alternative techniques. By granting concessions, the government is raising the perceived likelihood of success of terrorist tactics (see Chapter 7). Third, terrorist grievances must be well articulated if they are to be satisfied; this is often not the case for modern-day transnational terrorism. For example, the grievances of al-Qaida are not clear and appear to evolve over time. Fourth, countries' responses to terrorists' demands are apt to work at cross purposes – for example, a country that removes its peacekeepers in response to a terrorist campaign makes it more difficult for other countries to continue their missions. After the 23 October 1983 bombing of the US Marine barracks in Beirut, Lebanon, President Reagan withdrew US forces from Lebanon and other countries followed suit. At the transnational level, one country's concessions create externalities for other countries as their policy options become more limited.

A more fruitful approach is to make nonterrorist activities less expensive and therefore more attractive, rather than to reward terrorist campaigns through concessions (Anderton and Carter, 2005; Frey, 2004). The latter policy goes against the principle of liberal democracies by allowing dissidents to circumvent the political process by extorting political

change with the threat of violence. Such concessions reduce the payoffs to voting and utilizing legitimate institutions for change. By contrast, a government's encouragement of peaceful dissent raises the attractiveness of legal means. Ironically, when terrorism surfaces in a country, a common governmental reaction is to limit legitimate protest, thereby inducing more terrorism. Terrorist groups with political and military wings – for example, Hezbollah, Hamas, and the Irish Republican Army – pursue both legitimate and illegitimate means. Thus, actions to bolster the relative attractiveness of legitimate means can curb terrorism without compromising the ideals of a liberal democracy by rewarding terrorism.

CONCLUDING REMARKS

This chapter has applied simple game theory to analyze strategic differences between proactive and defensive policies. For transnational terrorism, the policy choices of a targeted government can have positive and/or negative consequences or externalities for other targeted countries. For instance, defensive measures taken by one country can deflect an attack to other, less protected countries. Following 9/11, industrial countries redoubled their efforts to harden targets; these efforts coincided with more attacks in other places – for example, Kenya, Morocco, Malaysia, Indonesia, and Turkey – where defensive measures were not increased. At the international level, there is a real need for cooperation or else countries will work at cross purposes with a tendency to undersupply proactive measures and oversupply defensive ones. Some defensive actions are weakest-link public goods, where the smallest precaution taken determines the level of safety for all. To shore up a weakest link, wealthy nations may have to bolster the defenses of other nations. In a globalized world, a country's interests can be attacked in places where defenses are inadequate, so weakest-link nations are everyone's concern. Many proactive policies are best-shot public goods, where the greatest action protects everyone. For such measures, coordination is important so that actions are not duplicated in a wasteful manner.

In the case of domestic terrorism, the central government can account for the strategic consequences arising from proactive and defensive policies. A central viewpoint allows the government to raise security to acceptable standards countrywide. The central government is motivated to pursue terrorists that target any of the countries' diverse interests. One essential question that calls for further research is the proper allocation of resources between proactive and defensive measures. This is an

interesting issue, because the two sets of policies are interdependent. If, for example, proactive measures weaken the terrorist threat, then there is less need for defensive policy. As all targets are secured through defensive measures, there may be less need to go after the terrorists. In analyzing this allocation, the strategic interaction can be extended to include the terrorists along with the targeted countries.